

Imre Lakatos, The methodology of scientific research programmes - An Overview

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Imre Lakatos, The methodology of scientific research programmes - An Overview

Imre Lakatos (1922-1974) was one of the modern philosophers of science and mathematics. His main contribution to philosophy was the development of the concept of methodology of scientific research programmes and the use of this methodology in the rational reconstruction of science. Lakatos presents his methodology in contrast to the systems proposed

by Popper, Kuhn and Feyerabend, though from each he took over ideas, accepting a modified falsifiability and the Kuhn paradigm that he adapted to the system he proposed:

"According to my methodology the great scientific achievements are research programmes which can be evaluated in terms of progressive and degenerating problemshifts; and scientific revolutions consist of one research programme superseding (overtaking in progress) another. This methodology offers a new rational reconstruction of science. It is best presented by contrasting it with falsificationism and conventionalism, from both of which it borrows essential elements." [p 110]

Practically, Lakatos uses Popper's falsifiability at the level of scientific theories, but rather accepting Feyerabend's methodological tolerance, and his research programmes can be identified up to a point with Kuhn's scientific revolutions.

The methodology of scientific research programmes is a collection of papers published over time expressing a radical review of Popper's demarcation criterion between science and non-science, leading to a new theory of scientific rationality. Volume I addresses aspects of the philosophy of science, and volume II contains works on the philosophy of mathematics.

For a science historian, the reconstruction proposed by Lakatos is attractive and explains the evolution of science to a level that has not been achieved before. The basic evaluation unit proposed by Lakatos - the research programme - and especially the dynamics of these programmes, how they appear, develop, mature, degenerate and then are replaced by other better research programmes is, in my opinion, a reconstruction of science much closer to truth than Kuhn's paradigms.

Although all sections of the book deal with the same main idea, they are relatively autonomous. But who wishes to understand in detail Lakatos' proposed methodology on which to develop a rational history of science must carefully pass through at least two of these sections: "Falsification and methodology of scientific research programs" describing, according to the author, the basic evaluation unit "of the methodology, and "The history of science and its rational

reconstructions," which explains how research methodology can be used to reconstruct science as close as possible to the real situation, in a rational way: "The methodology of scientific research programmes constitutes, like any other methodology, a historiographical research programme. The historian who accepts this methodology as a guide will look in history for rival research programmes, for progressive and degenerating problemshifts." [p 114]

In "Introduction", Lakatos begins with an analysis of proposed solutions and problems with these solutions for the demarcation between science and pseudoscience. According to Lakatos, the typical descriptive unity of great scientific achievements is not an isolated hypothesis, but "a powerful problem-solving machinery, which, with the help of sophisticated mathematical techniques, digests anomalies and even turns them into positive evidence." [p 4] In a partially humorous approach ("Scientists have thick skins. They do not abandon a theory merely because facts contradict it." [p 4]), an anomaly for Lakatos is not the same as a rejection for Popper. The "machinery" proposed by Lakatos for the research program is like an army, with a similar fighting strategy, in which it first attempts to bring anomalies ("enemies") to the program, turning them into positive evidence. If this test fails, they are simply ignored.

After a presentation of the main theories of knowledge, Lakatos proposes a modification of Popper's criterion, which he calls "sophisticated methodological falsificationism". From this perspective, the delimitation criterion should apply not to a hypothesis or to an isolated theory, but rather to a whole research programme. Sophisticated falsificationism thus changes the question of how the theories are evaluated to the question of how to evaluate the series of theories. It is not an isolated theory, but only a series of theories that can be considered to be scientific or non-scientific: the application of the term "scientific" to a single theory is a misconduct. But the problem of sophisticated falsification lies precisely in the multitude of

theories considered. In the case of two incompatible theories, we have to go back to the conventional aspects of methodological falsificationism or to the incontestable hypotheses of dogmatic falsificationism to make a choice. Using new corroborated facts involves a clear delimitation between observational and theoretical terms, with conventional decisions on what constitutes "basic" knowledge.

"Neojustificationist honesty demanded the specification of the probability of any hypothesis in the light of the available empirical evidence. The honesty of naive falsificationism demanded the testing of the falsifiable and the rejection of the unfalsifiable and the falsified. Finally, the honesty of sophisticated falsificationism demanded that one should try to look at things from different points of view, to put forward new theories which anticipate novel facts, and to reject theories which have been superseded by more powerful ones." [p 38]